The above examples advantageously reduce the chance of network outages. By controlling temperature fluctuation of the dispersion compensating fiber and the structures that support the dispersion compensating fiber, thermal expansion of the dispersion compensating fiber and the structure is reduced resulting in a reduced stress on the dispersion compensating fiber. Reducing the stress on the dispersion compensating fiber helps control PMD fluctuation and makes PMD compensation an easier task. Consequently, the chance of an outage due to PMD may advantageously be reduced.

CLAIMS:

What is claimed is:

1. An optical amplifier system for use in an optical communication network, the optical amplifier system comprising:

a span of dispersion compensating fiber configured to carry optical signals; and

a temperature control system positioned proximate to the span of dispersion compensating fiber and configured to control the temperature of the environment directly surrounding the span of dispersion compensating fiber to reduce polarization mode dispersion fluctuation in the span of dispersion compensating fiber.

2. The optical amplifier system of claim 1 wherein proximate refers to the temperature control system being positioned within one foot of the span of dispersion compensating fiber.

3. The optical amplifier system of claim 1 wherein the temperature control system is configured to control the temperature of the environment directly surrounding the span of dispersion compensating fiber independent of the temperature of the environment surrounding the remaining components of the optical amplifier system.

4. The optical amplifier system of claim 1 wherein the temperature control system is configured to maintain the temperature of the environment directly surrounding the span of dispersion compensating fiber at a constant temperature between about 45 degrees Celsius and 70 degrees Celsius.

5. The optical amplifier system of claim 1 wherein the temperature control system comprises:

a temperature chamber configured to substantially enclose the span of dispersion compensating fiber;

a sensor system configured to measure a temperature in the temperature chamber and provide an indication of the temperature;

at least one heating element configured to emit heat in the temperature chamber; and

a controller configured to control the at least one heating element based on the indication of the temperature in the temperature chamber.

6. The optical amplifier system of claim 5 wherein the controller is configured to control the at least one heating element by varying a voltage applied to the at least one heating element.

7. The optical amplifier system of claim 1 wherein a bit rate of the optical signals is at least 40 Gb/s.

8. The optical amplifier system of claim 1 wherein the span of dispersion compensating fiber is configured to reduce chromatic dispersion in the optical signals.

9. The optical amplifier system of claim 1 further comprising:

a pump system configured to pump the span of dispersion compensating fiber;

wherein the optical amplifier system is configured to amplify the optical signals traveling over the span of dispersion compensating fiber due to the Raman Effect.

10. The optical amplifier system of claim 1 wherein the optical amplifier system further comprises:

an Erbium-doped fiber amplifier coupled to the span of dispersion compensating fiber.

11. A method of operating an optical amplifier system comprising a span of dispersion compensating fiber configured to carry optical signals, wherein the optical amplifier system is configured for use in an optical communication network, the method comprising:

positioning a temperature control system proximate to the span of dispersion compensating fiber; and

controlling the temperature of the environment directly surrounding the span of dispersion compensating fiber with the temperature control system to reduce polarization mode dispersion fluctuation in the span of dispersion compensating fiber.

12. The method of claim 11 wherein proximate refers to the temperature control system being positioned within one foot of the span of dispersion compensating fiber.

13. The method of claim 11 wherein controlling the temperature of the environment directly surrounding the span of dispersion compensating fiber comprises:

controlling the temperature of the environment directly surrounding the span of dispersion compensating fiber independent of the temperature of the environment surrounding the remaining components of the optical amplifier system.

14. The method of claim 11 further comprising:

maintaining the temperature of the environment directly surrounding the span of dispersion compensating fiber at a constant temperature between about 45 degrees Celsius and 70 degrees Celsius with the temperature control system.

15. The method of claim 11 wherein the temperature control system comprises a temperature chamber configured to substantially enclose the span of dispersion compensating fiber, a sensor system, at least one heating element, and a controller, the method further comprising:

in the sensor system, measuring a temperature in the temperature chamber and providing an indication of the temperature;

in the at least one heating element, emitting heat in the temperature chamber; and

in the controller, controlling the at least one heating element based on the indication of the temperature in the temperature chamber.

16. The method of claim 15 wherein controlling the at least one heating element comprises:

controlling the at least one heating element by varying a voltage applied to the at least one heating element.

17. The method of claim 11 wherein a bit rate of the optical signals is at least 40 Gb/s.

18. The method of claim 11 wherein the span of dispersion compensating fiber is configured to reduce chromatic dispersion in the optical signals.

19. The method of claim 11 wherein the optical amplifier system further comprises a pump system, the method further comprising:

pumping the span of dispersion compensating fiber with the pump system;

wherein the optical amplifier system is configured to amplify the optical signals traveling over the span of dispersion compensating fiber due to the Raman Effect.

20. The method of claim 11 wherein the optical amplifier system further comprises an Erbium-doped fiber amplifier coupled to the span of dispersion compensating fiber.